

## Preface

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The Department of Veterans Affairs (VA) operates one of the largest integrated health care systems in the United States. It served 4.2 million veterans in 2001, operating a network of 172 hospitals and 859 clinics at a cost of \$21.3 billion (U.S. Department of Veterans Affairs Veterans Health Administration 2002). As part of its mission, VA conducts clinical trials and health services research to improve the quality and effectiveness of patient care. Economics is an increasingly important part of these studies.

VA also has unique features that present both opportunities and challenges for economics research. Patients have a uniform set of health care benefits and few copayments, allowing patients equal access to health care. VA benefits include pharmacy, long-term care, mental health services, dental care, eyeglasses, hearing aids, prosthetics, home health care, and other services. VA also has comprehensive utilization databases, making it possible to track the quantity of care received by an individual throughout the system. The generous coverage and extensive databases provide a relatively complete understanding of the effect of interventions on all health services use. Such a comprehensive view is not possible in Medicare or private payer databases, in which benefits are generally more limited and separate organizations often provide behavioral health and long-term care.

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Despite the advantages of VA as a site for medical care research, health economics studies face a number of hurdles. VA is an integrated system with budget allocations based on the number of individuals served. Physicians are salaried employees, and care is almost always provided without billing patients or third party payers. Billing data are used to estimate costs in other parts of the U.S. health care system. In the absence of this source of information, VA researchers have developed other methods for estimating costs.

### **VA INITIATIVES TO IMPROVE HEALTH ECONOMICS RESEARCH**

In early 1997, the VA Health Services Research and Development Service (HSR&D) formed a committee to consider how to improve research on the cost of VA care. HSR&D leadership was concerned that many research proposals were not using appropriate methods of determining cost. A second concern was substantial duplication of effort, with independent researchers “reinventing the wheel” for different studies.

The committee was made up of VA health economists and other health services researchers. In September 1997, the committee issued a report that offered guidance to researchers wishing to study the cost of VA care. The committee concluded that the current methods needed improvement and organized a meeting to discuss cost issues.

The meeting was held in February 1998. It was attended by 45 economists, health services researchers, and policy makers, from both in and outside VA. Prior to the meeting, discussion papers were drafted. These provided attendees with information about VA economics research and provided a framework for discussion. The meeting attendees wrote a consensus statement, with recommendations to HSR&D. The meeting recommendations and discussion papers were subsequently published (Swindle et al. 1999).

Meeting attendees recommended that costs be determined with a blend of methods, combining direct primary measurement with costing based on administrative data. The attendees identified needed improvements to the VA infrastructure. Since most studies need cost estimates based on administrative data, it was recommended that this activity be conducted by a national center. It was also recommended that the center provide information, consultant services, and training.

HSR&D acted on these recommendations, publishing a request for proposals for an economics center in September 1998. Competing proposals were peer reviewed. In September 1999, funding was allocated to researchers at the HSR&D Center of Excellence located in Palo Alto, California.

The VA Health Economics Resource Center (HERC) was founded with the mission of improving the quality of VA health economics research. HERC's initial goals reflected the needs identified in the 1998 economics consensus statement. The primary focus was on the determination of VA health care costs. Specific goals included improved methods of direct measurement of health care cost, the creation of a comprehensive set of estimates of the cost of all VA health care encounters, and the documentation of a newly emerging VA cost allocation system, the Decision Support System (DSS). HERC set out to document VA financial databases, to describe methods of estimating hospital costs with regression analysis, and to support methods of determining non-VA costs and patient-incurred costs. Finally, HERC began offering training and consulting services.

### ARTICLES IN THIS SUPPLEMENT

This supplement describes the initial accomplishments of HERC. Five articles describe improved methods of cost determination; the sixth contrasts the methods and offers suggestions on how to choose among them. The remaining article provides patient-level information on the cost of health care provided to VA patients with different chronic diseases.

The first three articles in this supplement describe a major focus for HERC, the creation of a comprehensive VA cost database. In the absence of billing data, individual researchers had to undertake the daunting task of assigning a cost to each VA hospital stay and outpatient visit. Prior to HERC, independent economists working on different studies did this work. Duplication of effort was common and not a good use of scarce research resources. With the funding of the center, a more thorough job of cost determination could be done than by any single investigator working alone.

HERC combined VA cost and utilization databases with non-VA measures of relative value to estimate the cost of all inpatient and outpatient care provided by VA since 1 October 1997. These HERC cost estimates were constructed by assuming that each encounter had the average cost of all encounters with the same characteristics. We thus refer to these as "average cost" estimates and the comprehensive set of estimates as the HERC "average cost" database. These estimates are analogous to the "gross costs" described by the U.S. task force on cost effectiveness and health and medicine (Luce et al. 1996).

The scope of the average cost effort is quite large. VA provided nearly 700,000 hospital stays and 63.6 million outpatient visits in the fiscal year ending 30 September 2000 and spent some \$19.3 billion on health care. This is 9 percent of the \$224.4 billion spent by the U.S. Medicare program in 2000 (Levit et al. 2002).

The first article in this supplement, by Wagner, Chen, and Barnett (2003 [this issue]), describes estimation of the costs of acute VA hospital stays for medical and surgical care. The relationship between resource use and the characteristics of hospital stays was derived from data on non-VA hospital stays. We considered using hospital stay data from Medicare or from the Healthcare Cost and Utilization Project. The project's data have the advantage of including patients who were younger than 65, but they do not track the number of days spent in intensive care, which is included in Medicare data. We used the Medicare data because we found that the number of days in intensive care was more important than age in explaining the cost of hospital stays, controlling for other factors.

A regression model was estimated to determine how cost-adjusted charges incurred in non-VA hospitals were affected by characteristics of the stay, such as the diagnosis related group, the length of stay, the number of days in the intensive care unit, and patient demographics. The regression identified 74 percent of the variation of resource use, a great improvement over earlier efforts that used regressions with VA cost data (Barnett 1997). The parameters from this model were combined with the characteristics of VA hospital stays. The predicted costs were then adjusted to reflect actual expenditures for hospital care, as reported in the VA Cost Distribution Report, a cost allocation report that provides the cost of departments at each VA hospital.

The second article, by Yu, Wagner, et al. (2003 [this issue]), describes estimation of the cost of rehabilitation, mental health, and long-term hospital stays. It makes a unique contribution by using case mix measures to estimate the cost of nursing home stays.

The case mix measures were estimated using data from periodic assessments of every VA nursing home patient. These assessments evaluate patient acuity and assign each individual to a resource utilization group. Each resource utilization group has an associated value representing the relative quantity of staff resources required for care (Fries 1990). VA assesses nursing home patients at admission and every April and October thereafter. These longitudinal measures were combined to estimate the relative cost of long-term care. A regression model was used to estimate the acuity of patients who died or were discharged more than 90 days after their previous assessments.

The third article, by Phibbs et al. (2003 [this issue]), describes the method of determining the cost of ambulatory care. VA characterizes outpatient visits using current procedural terminology codes, the same system used by non-VA providers to prepare patient bills. HERC used the reimbursement schedules of Medicare and other health care payers to estimate hypothetical payments for ambulatory care encounters. These payments were adjusted to reflect the actual aggregate cost of VA ambulatory care departments.

Since VA is largely a hospital-based provider, a challenging aspect of this study was to estimate facility costs, which are distinct from the costs of physicians and other clinicians. Facility costs are significant. When care is provided in an ambulatory care facility, the U.S. Medicare program spends about as much on facility fees as it does on the services of physicians and other clinicians. Ambulatory care facilities have traditionally submitted itemized bills, but there was no published data on the average bill or the average Medicare reimbursement for specific services. This study took advantage of the new Medicare payment method for facilities: each procedure has been assigned to an ambulatory payment category, and a payment rate has been set based on historical payments to facilities.

The “average cost” estimates described in these three articles represent an important step forward for VA health economics researchers and are an example of techniques that may be used in other health care systems. If the analyst has detailed utilization data and department-level cost estimates, then the cost of individual patient care encounters can be estimated using relative values estimated from data of comparable providers. U.S. providers that lack billing data, such as those hospitals operated by managed care organizations, could base cost estimates on models estimated from data of U.S. hospitals with Medicare data. Canadian hospitals could also estimate their costs by constructing models from those Canadian hospitals that have adopted activity-based patient-level accounting systems.

Because of the assumptions required to prepare the “average cost” estimates, they are not appropriate for all studies. Each of the methods articles explains the specific limitations in more detail, but it is important to remember that cases with the same observed characteristics are assigned the same costs. Direct measurement is needed to find the cost of treatment innovations and the cost of care where there are no comparable non-VA providers.

The fourth article, by Smith and Barnett (2003 [this issue]), describes methods of determining costs by direct measurement. Although many studies have directly measured the cost of health care interventions, there is surprisingly little literature that gives guidance on how this should be done. This article seeks to close that gap. It describes how characteristics of the analysis, such as its perspective and time frame, affect the methods that are used.

The article also describes methods of assessing the time spent by staff, including time and motion studies, activity logs, and surveys of managers. The article notes that the hourly cost of employing staff must be adjusted for “nonapplied” time spent on administrative work, vacation, or sick leave; without this adjustment, the analyst will understate costs.

Smith and Barnett also describe methods of measuring patient-incurred cost. The article reviews methods of determining health care utilization from a

patient survey, a technique that is often needed to determine cost of care away from the study site. It discusses VA data sources for salaries, supplies, and capital. With the exception of this description of VA data, the article describes methods and considerations that apply equally to non-VA settings.

The fifth article, by Smith and Joseph (2003 [this issue]), describes VA data on the cost of pharmaceuticals. It describes four new databases of prescriptions filled by VA facilities nationwide. One database identifies drugs provided to inpatients. All of the databases have drug cost information. Prescription-level data make it much easier to gather information on the complete cost of health care, including drugs dispensed to ambulatory patients, which is one of the fastest growing areas of health care cost. There are few other national databases of prescription drug use; the U.S. Medicare program does not include a drug benefit. Such data also make it possible to conduct observational studies of pharmaceutical use, for example, comparisons of patients at facilities that include a drug on their formulary to patients at locations that do not.

The sixth article, by Barnett (2003 [this issue]), compares different cost methods. It describes VA cost and utilization data. It describes ways to determine cost by direct measurement, preparation of a pseudo-bill, and the estimation of a cost regression. It provides an overview of the HERC average cost data sets, created using a pseudo-bill and cost regression methods. It also describes the data from the VA activity-based cost allocation system, an implementation of the DSS. The article describes the strengths and drawbacks of each method. The choice of method represents a trade-off between accuracy and the resources available to conduct the study. This article offers the reader guidance on how to target research resources so that the most accurate methods are used where they are most needed.

The final article in the supplement combines the HERC average cost database with VA pharmacy cost data to report the annual health care costs incurred by veterans with common chronic diseases (Yu, Ravelo, et al. 2003 [this issue]). Few other studies have systematically looked at the costs associated with a large number of diverse chronic diseases. Patients with chronic diseases appear to account for a greater share of the VA costs than they do in other systems. Those patients who had at least 1 of the 29 chronic diseases studied accounted for 72 percent of VA patients and 96 percent of VA costs. This article is unique because it describes patients in a large national system, examines the relationship between chronic disease and the cost of pharmaceuticals dispensed to ambulatory patients, and includes the cost of specialized treatment of substance use disorders and other mental health conditions.

## **ACCOMPLISHMENTS AND FUTURE DIRECTIONS FOR THE VA HERC**

The mission of HERC is to increase VA's capacity to conduct high-quality health economics research and cost-effectiveness studies so that the nation and the nation's veterans may get the best possible health care value from available resources. The VA HSR&D service recently approved a 5-year strategic plan for HERC.

To improve the usefulness of existing VA data, HERC will document VA data on pharmacy, prosthetics, capital, contract care, and the new VA general ledger. It will also document a new national department-level cost database from DSS and update its existing guide on the DSS encounter-level extracts.

HERC will continue to estimate the cost of all VA health care encounters but revise its methods to accommodate new procedure codes and diagnostic related groups. HERC is adding fields to its inpatient databases with the sub-total cost for each type of care and developing a national person-level cost data set.

HERC plans to develop and to improve methods of determining patient-incurred costs and the cost of veterans' non-VA care. The center will develop tools that researchers can use to access DSS data on the quantity and cost of intermediate health care products and create economic data sets needed by VA researchers, including tabulations of VA cost and utilization data, geographic wage data, and data on facility consolidations.

There is ongoing work to improve the quality of VA health care data. VA has created new databases, improved its coding practices, and adopted standardized procedures for DSS. Evaluation of the quality of data is an area of focus for HERC. HERC plans to evaluate the quality of pharmacy, prosthetics, and ambulatory care data, as well as the DSS national cost extracts. HERC will also compare cost methods, comparing DSS cost data to the HERC average cost data.

HERC continues to offer training, a consulting service, and Web-based information to VA researchers. It will conduct a formal analysis of the needs of VA health economics researchers and will report the findings to the HSR&D.

HERC economists are also engaged in clinical trials and health services studies that evaluate the cost effectiveness of a variety of clinical problems, from the diagnosis of lung cancer to the treatment of heart disease, AIDS, and substance use disorders. This work is providing practical experience so that they may work with other VA economists to improve the quality of health economics research.

Biomedical discoveries and technological advancements are providing clinicians with an increasing set of options. They are also causing the cost of



health care to continue to increase. Because resources are limited, every innovation cannot be adopted. In the past, health care decision makers have used effectiveness criteria to evaluate new treatments. They are increasingly interested in economics. New medical care interventions are no longer judged solely on their ability to improve outcomes; decision makers want to understand whether they yield sufficient value to justify their cost. Health economics will play a key role in deciding what medical care will be offered and to whom.

## REFERENCES

- Barnett, P. G. 1997. Research without billing data. Econometric estimation of patient-specific costs. *Medical Care* 35 (6): 553-63.
- . 2003. Determination of VA health care costs. *Medical Care Research and Review* 60 (3 Suppl.): 124S-141S.
- Fries, B. E. 1990. Comparing case-mix systems for nursing home payment. *Health Care Financial Review* 11 (4): 103-19.
- Levit, K., C. Smith, C. Cowan, H. Lazenby, and A. Martin. 2002. Inflation spurs health spending in 2000. *Health Affairs* 21 (1): 172-81.
- Luce, B. R., W. G. Manning, J. E. Siegel, and J. Lipscomb. 1996. Estimating costs in cost-effectiveness analysis. In *Cost-effectiveness in health and medicine*, edited by M. R. Gold, J. E. Siegel, L. B. Russell, and M. C. Weinstein. New York: Oxford University Press.
- Phibbs, C. S., A. Bhandari, W. Yu, and P. G. Barnett. 2003. Estimating the costs of VA ambulatory care. *Medical Care Research and Review* 60 (3 Suppl.): 54S-73S.
- Smith, M. W., and P. G. Barnett. 2003. Direct measurement of health care costs. *Medical Care Research and Review* 60 (3 Suppl.): 74S-91S.
- Smith, M. W., and G. Joseph. 2003. Pharmacy data in the VA health care system. *Medical Care Research and Review* 60 (3 Suppl.): 92S-123S.
- Swindle, R., C. VanDeusen-Lukas, D. Alexander-Meyer, P. G. Barnett, and A. M. Hendricks. 1999. Cost analysis in the Department of Veterans Affairs: Consensus and future directions. *Medical Care* 37 (4): AS3-AS8.
- U.S. Department of Veterans Affairs Veterans Health Administration. 2002. FY2003 Department of Veterans Affairs budget submissions. VHA CFO Office of Financial Management & Budget (173B), Washington, D.C. Retrieved from <http://www.va.gov/vetdata/ProgramStatics/index.htm>.
- Wagner, T. H., S. Chen, and P. G. Barnett. 2003. Using average cost methods to estimate encounter-level costs for medical-surgical stays in the VA. *Medical Care Research and Review* 60 (3 Suppl.): 15S-36S.
- Yu, W., A. Ravelo, T. H. Wagner, C. S. Phibbs, A. Bhandari, S. Chen, and P. G. Barnett. 2003. Prevalence and costs of chronic conditions in the VA health care system. *Medical Care Research and Review* 60 (3 Suppl.): 146S-167S.
- Yu, W., T. H. Wagner, S. Chen, and P. G. Barnett. 2003. Average cost of VA rehabilitation, mental health, and long-term hospital stays. *Medical Care Research and Review* 60 (3 Suppl.): 40S-53S.